

High-Efficiency, High-Power Laser Transmitter for Deep-Space Communication, Phase I

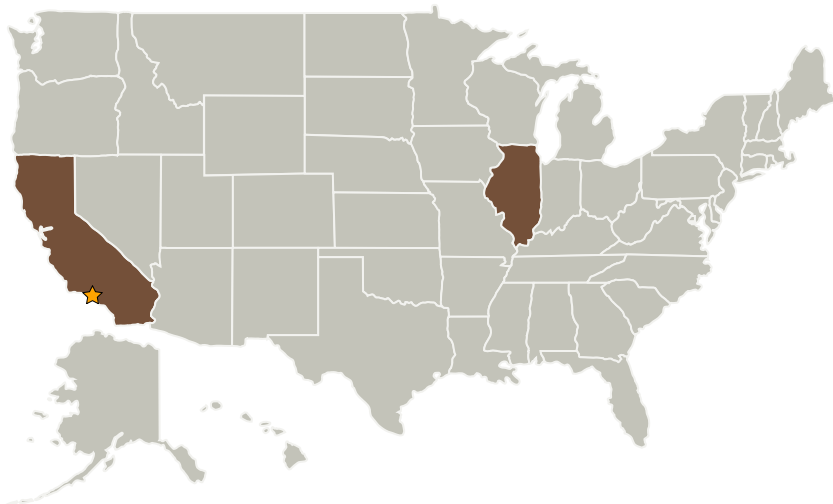
Completed Technology Project (2009 - 2009)



Project Introduction

There is demand for vastly improved deep space satellite communications links. As data rates dramatically increase due to new sensor technologies and the desire to pack even more sensors on spacecraft, it is imperative that new solutions be compact in size, light in weight, be high speed, and highly power efficient. Traditional RF links suffer $1/r^2$ losses, resulting in low received power, thereby limiting overall data rates. NASA has recognized optical links offer potential improvements in power and in size due to a substantially narrower beam and smaller components. An ideal technology for such links is a laser transmitter master oscillator power amplifier (MOPA) using pulse position modulation techniques. Previous work has demonstrated laser transmitter MOPAs up to 100 MHz with wall plug efficiencies up to 18.9% and operating at 1064nm which requires bulky optical components. There still is room for improvement utilizing additional techniques to further increase efficiency and size reduction. This proposal addresses these improvements using several techniques.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Vega Wave Systems, Inc.	Supporting Organization	Industry	West Chicago, Illinois

Primary U.S. Work Locations	
California	Illinois

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.3 Lasers